

Appendix D

Exhaust Emission Standards and Test Procedures; Gasoline Spark-Ignition Marine Engines

NOTE: This document incorporates by reference various sections of the Code of Federal Regulations, some with modifications. California provisions which replace specific federal provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" for the new California language. The symbols "*****" and "..." mean that the remainder of the federal text for a specific section, which is not shown in these procedures, has been included by reference, with only the printed text changed. Federal regulations which are not listed are not part of the procedures.

The following provisions of Subparts A to E, Part 91, Title 40, Code of Federal Regulations, as adopted or amended by the U.S. Environmental Protection Agency on the date listed, and only to the extent they pertain to the testing and compliance of exhaust emissions from gasoline spark-ignited marine engines, are adopted and incorporated by reference as the Exhaust Emission Standards and Test Procedures for Gasoline Spark-Ignition Marine Engines, except as altered or replaced by the provisions set forth below.

Subpart A - General

91.1 Applicability. October 4, 1996.

91.2 Applicable date. October 4, 1996.

91.3 Definitions. October 4, 1996.

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"Administrator" DELETE

REPLACE WITH: "Administrator" means the Executive Officer of the Air Resources Board.

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"EPA enforcement officer" DELETE

REPLACE WITH: "EPA enforcement officer" means the Executive Officer or his or her delegate.

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INSERT "Off road aftermarket parts manufacturer"

"Off road aftermarket parts manufacturer" means any person engaged in the manufacturing or assembling of add-on or modified parts, as defined in Section 1900(b), (1) and (10), Chapter 3, Title 13, California Code of Regulations, for off-road vehicles, engines, or equipment subject to California or federal emission standards.

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“Presentation of Credentials” DELETE

REPLACE WITH: “Presentation of Credentials” means the display of the document designating a person as an EPA enforcement officer or ARB authorized representative.

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91.4 Acronyms and abbreviations. October 4, 1996.

91.5 Table and figure numbering; position. October 4, 1996.

91.6 Reference materials. October 4, 1996.

Subpart B - Emission Standards and Certification Provisions

91.101 Applicability. October 4, 1996.

91.102 Definitions. October 4, 1996.

91.103 Averaging, banking, and trading of exhaust emission credits. October 4, 1996.

91.104 Exhaust emission standards for outboard
and personal watercraft engines. October 4, 1996.

91.109 Requirement of certification-closed crankcase. October 4, 1996.

91.110 Requirement of certification- prohibited controls. October 4, 1996.

91.111 Requirement of certification-prohibition of defeat devices. October 4, 1996.

91.112 Requirement of certification- adjustable parameters. October 4, 1996.

91.117 Certification procedure - service accumulation. October 4, 1996.

91.118 Certification procedure - testing. October 4, 1996.

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(b) DELETE

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91.119 Certification procedure - use of special test procedures. October 4, 1996.

91.120 Compliance with Family Emission Limits over useful life. October 4, 1996.

Subpart D - Emission Test Equipment Provisions

91.301 Scope; applicability. October 4, 1996.

91.302 Definitions. October 4, 1996.

91.303 Acronyms and abbreviations. October 4, 1996.
91.304 Test equipment overview. October 4, 1996.
91.305 Dynamometer specifications and calibration accuracy. October 4, 1996.
91.306 Dynamometer torque cell calibration. October 4, 1996.
91.307 Engine cooling system. October 4, 1996.
91.308 Lubricating oil and test fuel. October 4, 1996.
91.309 Engine intake air temperature measurement. October 4, 1996.
91.310 Engine intake air humidity measurement. October 4, 1996.
91.311 Test conditions. October 4, 1996.
91.312 Analytical gases. October 4, 1996.
91.313 Analyzers required. October 4, 1996.
91.314 Analyzer accuracy and specifications. October 4, 1996.
91.315 Analyzer initial calibration. October 4, 1996.
91.316 Hydrocarbon analyzer calibration. October 4, 1996.
91.317 Carbon monoxide analyzer calibration. October 4, 1996.
91.318 Oxides of nitrogen analyzer calibration. October 4, 1996.
91.319 NOx converter check. October 4, 1996.
91.320 Carbon dioxide analyzer calibration. October 4, 1996.
91.321 NDIR analyzer calibration. October 4, 1996.
91.322 Calibration of other equipment. October 4, 1996.
91.323 Analyzer bench checks. October 4, 1996.
91.324 Analyzer leakage check. October 4, 1996.
91.325 Analyzer interference checks. October 4, 1996.
91.326 Pre- and post-test analyzer calibration. October 4, 1996.
91.327 Sampling system requirements. October 4, 1996.
91.328 Measurement equipment accuracy calibration frequency table. October 4, 1996.
91.329 Catalyst thermal stress test. April 24, 1997.

Appendix A to Subpart D of Part 91- Tables. October 4, 1996.

Table 1 -Symbols Used in Subparts D and E

Table 2 - Measurement Accuracy Calibration Frequency

Table 3- Test Fuel Specifications

Appendix B to Subpart D of Part 91- Figures. October 4, 1996.

Figure 1 -Exhaust Gas Sampling and Analytical Train, Continuous Sampling

Figure 2 -NOx Converter Efficiency Detector

Subpart E- Gaseous Exhaust Test Procedures

91.401 Scope; applicability. October 4, 1996.
91.402 Definitions. October 4, 1996.
91.403 Symbols and abbreviations. October 4, 1996.
91.404 Test procedure overview. October 4, 1996.
91.405 Recorded information. October 4, 1996.
91.406 Engine parameters to be measured and recorded. October 4, 1996.

91.408 Pre-test procedures. October 4, 1996.
91.409 Engine dynamometer test run. October 4, 1996.
91.410 Engine test cycle. October 4, 1996.
91.411 Post-test analyzer procedures. October 4, 1996.
91.412 Data logging. October 4, 1996.
91.413 Exhaust sample procedure- gaseous components. October 4, 1996.
91.414 Raw gaseous exhaust sampling and analytical system description. October 4, 1996.
91.415 Raw gaseous sampling procedures. October 4, 1996.
91.416 Intake air flow measurement specifications. October 4, 1996.
91.417 Fuel flow measurement specifications. October 4, 1996.
91.418 Data evaluation for gaseous emissions. October 4, 1996.
91.419 Raw emission sampling calculations. October 4, 1996.
91.420 CVS concept of exhaust gas sampling system. October 4, 1996.
91.421 Dilute gaseous exhaust sampling and analytical system description. October 4, 1996.
91.423 Exhaust gas analytical system; CVS grab sample. October 4, 1996.
91.424 Dilute sampling procedure - CVS calibration. October 4, 1996.
91.425 CVS calibration frequency. October 4, 1996.
91.426 Dilute emission sampling calculations. October 4, 1996.

Appendix A to Subpart E of Part 91 - Tables. October 4, 1996.

Table 1 - Parameters To Be Measured Or Calculated and Recorded

Table 2- Test Cycle and Weighting Factors For Marine Engines

Appendix B to Subpart E of Part 91 - Figures. October 4, 1996.

Figure 1 -Sample Probe and Typical Hole Spacings

Figure 2 -Gaseous Emissions Sampling System (PDP-CVS) Showing both grab bag sampling and continuous sampling.

Figure 3 -Gaseous Emissions Sampling System (CVF-CVS)

Figure 4- Exhaust Gas Analytical System

Figure 5 -PDP-CVS Calibration Configuration

Figure 6 -CFV-CVS Calibration Configuration

Figure 7 -Sonic Flow Choking